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ORIGINAL ARTICLES.

A PERMANENT MAGNET FOR USE IN REMOVING FOREIGN BODIES IN THE CORNEA.[1]

BY WALTER B. JOHNSON, M.D., PATTERSON, N. J.

The magnet is presented as a useful instrument which can be manufactured at a very small cost and is always ready for immediate use.

It is made from a bar of the highest quality steel which is turned down until it is shaped like a cone-pointed cylinder slightly elongated at caeh end and very highly tempered, six inches in length, one-half inch in diameter, each cone measuring one and one-half inches, and the cylinder three inches.

[1]Read at the twenty-ninth annual meeting of the American Ophthalmological Society at New London, Conn.

The instrument is charged by rotating it within the magnetic field of a generator when the molecular charges which occur render it a permanent magnet.

It will continne in full magnetic strength for a long period of time, gaining or losing in a slight degree but always retaining a sufficient magnetic strength for all ordinary purposes.

It could be re-magnetized in a minute or so at any place where a dynamo is in operation.

It has served an excellent purpose on several occasions in removing small particles of steel from the cornea which had perforated and almost entered the anterior chamber, in which efforts at removal with a needle were not safe, endangering the passage of the foreign body into the anterior chamber, and in which passing a Beers' knife through the cornea behind the foreign body, has been advised, before attempting its removal with a needle.

CASES OF LATERAL HETEROPHORIA IN WHICH THE VERTICAL DIPLOPIA TEST PROVED UNTRUSTWORTHY.[1]

BY SAMUEL THEOBALD, M.D.,

Ophthalmic and Aural Surgeon to the Johns Hopkins Hospital and to the Baltimore Eye, Ear and Throat Hospital.

Having, many years since, become convinced that the tests which undertake to determine the strength of the external or internal recti muscles by the amount of lateral diplopia (prismatic effect) which they are capable of overcoming are very frequently misleading, it has been my habit for a long time, in measuring the relative strength of the lateral muscles, to place my chief dependence upon the vertical diplopia test. This test, also, I learned from experience was open to several sources of error; but, I found it practicable to eliminate them, and, in the great majority of cases in which I have employed it, it has proved an entirely trustworthy guide. It has been, therefore, a disappointment to me to find, as I have upon several occasions within the last year or two, that even when all known sources of error are guarded against, this test may prove entirely untrustworthy.

We all, of course, at the present day, appreciate that, in order to obtain satisfactory results with the vertical diplopia test, the refractive condition of the eyes, the presence of anisometropia, and especially at the reading distance, the tension of the accommodation, must be taken into account, and that the test

[1] A paper read before the American Ophthalmological Society, New London, Conn., July 19, 1893.

object employed must be of such a character as to eliminate as far as possible all disposition upon the part of the subject of the examination to blend the two retinal images—a fault which was conspicuous in the test object originally proposed by von Graefe. The several cases which I shall report briefly show, however, that, even when all these precautions have been taken, the test occasionally fails entirely to give us a true index of the condition of the lateral muscles. A description of the cases in point will make my meaning plainer, and to save time, I shall give only such details of each as are necessary for this purpose.

CASE I.—Sister M. N., æt. 40. Hypermetropia of high grade, anisometropia =.75 D., and astigmatism, according to the rule, in each eye of .62 D. At the first visit, without glasses, and with the test object at 20′, the cover test gave marked divergent squint of each eye, with slow return of binocular fixation on removal of the cover, occasionally the squint seeming not to disappear until the eyes were turned away from the test object. The vertical diplopia test gave, with the conditions all exactly the same, a variation in the position of the images, indicating at one moment exophoria and at the next esophoria of slight degree. Had the relation of the visual axes been the same with the vertical prism as with the cover test there would have been an exophoria of probably 15° or 20°. Two days later, with + 3. s for the left eye and + 3.25 s for the right (which were prescribed at the time for constant wear) the vertical diplopia test gave no insufficiency at 20′, although the cover test gave marked divergence, as at the previous visit without glasses. Six months after this the manifest hypermetropia having increased considerably mean time, with + 4.50 s for the left eye and +-4.75 s for the right (giving V.=$^{20}/_{xx}$) there was esophoria at 30′, with the vertical prism, varying from 1° to 0°, while with the cover test there was wide divergence of the right eye, and marked, but less wide divergence of the left eye.

At this examination it occurred to me to try the cover test *in combination with the vertical prism* (the refraction being cor-

rected as just mentioned), and, to my surprise, I found not only that the covered eye diverged as usual, but that *on removal of the cover the divergence disappeared, although the vertical diplopia was maintained by the prism, with about the same degree of promptness as when the cover test alone was employed.* In a word, the vertical diplopia seemed to have no controlling influence, whatever, upon the action of the lateral muscles.

CASE II.—Miss L. G., æt. about 15; refraction about emmetropia. Unconfirmed divergent squint of left eye, for which a free tenotomy of left external rectus was done, January 19, 1892, with happy result, the squint being corrected and the asthenopia relieved. Four weeks after the tenotomy a test of the muscular balance gave the following contradictory results: Cover test shows at 20′ divergent squint of the left eye most of the time, at 13″ divergence which is not always corrected upon removal of cover. Vertical diplopia test (prism before either eye) gives esophoria at 20′ varying from $^1/_2{}^\circ$ to 0°, and at 13″ neither esophoria nor exophoria.

CASE III.—Mrs. L. B. T., æt. about 55. Compound myopic astigmatism. With correction as follows: L. eye, — 2. s ⌒ — 1.12 c 50°. R. eye, — 2.25 s ⌒ — 2.25 c 135°, giving V=$^{19}/_{XLV}$, the muscular balance was tested with this result:

Cover test gives wide divergence with prompt correction at 20′, wide divergence with slow correction at 13″; vertical diplopia test gives no insufficiency at 20′, and only 2° of exophoria (less than the normal amount) at 13″.

CASE IV.—Miss L. C. N., æt. 15. Compound Ah. of low grade, marked exophoria, asthenopia, headache; free tenotomy of R. external rectus February 20, 1891. March 24, cover test gives divergence at 20′ with prompt correction; still wider divergence, especially of right eye, with equally prompt correction, at 13″. Vertical diplopia gives exophoria at 20′ of variable amount, about 3°, and at 13″ esophoria at times of 3° and again exophoria of uncertain amount. Seven months later the tests were repeated with the following result, her error of refraction not being corrected: With cover tests, decided divergence (either eye) at 20′ and at 13″, with deliberate recovery;

with vertical diplopia no insufficiency at 20′ or at 13″, dots varying in position at each distance, indicating at one moment slight esophoria and at the next slight exophoria. Had the relations of the optic axes been the same with the prism as with the cover test, a high grade of exophoria would certainly have been shown.

CASE V.—Mr. W. W., æt. about 44. Hypermetropia in left eye, compound Ah., against rule, in right eye, insufficiency of externi. Is wearing for near and far L. eye + 2.25 s ⌒ prism 3° base out; R. eye + 2.25 s ⌒ 1.50 c 180°. This case presented the same phenomenon described in Case I. the disappearance of a squint produced by the cover test, notwithstanding the presence of induced vertical diplopia. With his correcting glasses the vertical diplopia test showed only ½° of esophoria at 20′; with no glasses, it gave at the same distance esophoria varying from 9° to 0°. The cover test, without glasses, gave marked convergence (either eye) with usually prompt recovery, but occasionally the squint would remain for some moments after the cover was removed. When, with the vertical prism in position, the cover test was employed, the excluded eye at once squinted decidedly in, and upon removal of the cover the squint would disappear with about the same promptness as when the cover test alone (without vertical diplopia) was employed.

The foregoing cases do not constitute all those of similar character which I have met with within the past two or three years, for there are doubtless some that I have not been able to recall; but, supposing the total to be twice the number reported, it would still be very small, and quite insignificant when compared with the whole number of cases in which the vertical diplopia test was employed during the period named. While, therefore, disappointed, as I have said, at finding even a few cases in which this test failed me, I continued to employ it daily, and regard it as having great practical value.

I have endeavored to find a satisfactory explanation of the phenomenon I have described, but without success. The first explanation that suggested itself was that, while the two

images of the test object were certainly not fused (in the tests with the vertical prism), possibly the ends of certain vertical lines present in the two retinal pictures, such as the edges of the card upon which the asterisk employed in the near test stands, or the margin of the black board which carries the white disc used in the test at 20′, were unconsciously blended; but, this, at most, would have given lateral orthophoria, whereas the vertical prism gave *esophoria* in several of the cases reported, while exophoria of high grade was shown by the cover test.

Again, if we assume the presence of marked anisometropia, and suppose that with the cover test the fixation was with one eye and with the vertical diplopia test with the other, we might account for a marked difference between the results of the two tests; but, this source of error was eliminated, at least in all but one of the cases, by excluding first one eye and then the other in applying the cover test. Complete relaxation of accommodation during the cover test and tension of accommodation with the vertical prism could hardly account for the discrepancies observed, for the same test objects were used in each instance, and every effort made to guard against just such a misadventure as this.

I confess I have not been able to solve the riddle presented by these cases. Will not some member of the Society do it for me?

REPORT OF THE FIRST TWO DAYS' WORK IN THE SECTION OF OPHTHALMOLOGY OF THE PAN-AMERICAN MEDICAL CONGRESS, HELD AT WASHINGTON, D. C., SEPTEMBER 5TH TO 8TH, 1893.

BY ADOLF ALT, M.D.

The President, Dr. J. J. Chisolm, of Baltimore, greeted the members of the Section, and in a few words indicating the work before them called the meeting to order. About thirty five members were present.

Dr. G. M. Gould, of Philadelphia, read a paper entitled, *Homeochronous Hereditary Optic Nerve Atrophy*, in which he related the history of thirteen cases of hereditary atrophy of the optic nerve as observed in six generations of one family. The affection came on during adult manhood, usually at from twenty-eight to thirty-four years of age. Some members of the family required a slight traumatism only to induce partial or total blindness, showing a lack of strength of the visual organs. The striking point in these histories is, that after the second generation the disease is only transmitted through unaffected women. Passing the line through a male, although he be blind, stops the appearance of the disease. No woman of the family has been affected. In one group the inheritance passed through three unaffected females. So far as can be learned there are but three young males living who are liable to the disease, that is, who are sons of women of the family when the line has not been passed through a male since the second generation. Of these three brothers the oldest is nearly blind at the age of twenty-eight. His two brothers who have

not yet reached the ominous age have chronic retinitis with degenerative changes already observable. In the later generations there is a remarkable predominance of the male sex, and a rapid decrease of prolific females, thus fortunately bringing the vicious inheritance to a sharp ending. If the law holds good, there will be no danger of a reappearance of the atrophy after this, the sixth, generation, as there will be no male children of the family, whose ancestral line has not been passed through a male of the family.

The paper was illustrated by a carefully worked out diagram.

Dr. S. M. Burnett, of Washington, had had a similar case under observation in which the disease was also transmitted by the females of the family.

The papers announced to be read by Drs. J. F. Fulton, of St. Paul, Ch. A. Oliver, of Philadelphia, and E. Lopez, of Havana, were not read, the authors not being present.

Then followed Dr. G. E. Dean, of Scranton, with a paper on *Etiology and Early Management of Glaucoma.* This author stated that in the line of original thought he had come to the conclusion that glaucoma is due solely to eye-strain due to hypermetropia and hypermetropic astigmatism (former authors, particularly Schoen's book, were evidently not known to him). He thought that glasses, even temporary ones, pilocarpine, salicylate of sodium, acetanilide, applications of a solution of hot boracic acid every few hours would prevent or cure the outbreak of glaucoma. He is satisfied that surgical treatment, particularly iridectomy, will fall into disuse.

Dr. S. S. Koser, of Williamsport, did not agree with the author. He spoke of the uselessness of the so-called early management and medical treatment of glaucoma, and stated it as his opinion that surgical interference alone is useful.

Dr. S. F. McFarland, of Binghampton, has had bad results from iridectomy except in inflammatory glaucoma.

Dr. F. B. Tiffany, of Kansas City, believes with the author, that eye-strain causes glaucoma; as proof of this he considers the fact that in his early practice he saw many cases of glau-

coma, while of late they are rare (due to the correction of eye-strain).

Dr. T. Tyner, of Austjn, does not believe in the existence of chronic glaucoma, and knows only the inflammatory form.

Dr. H. Redmond, of Philadelphia, thinks bad results are due to incisions which lie too far in the cornea. Surgical treatment alone is valuable.

Dr. G. M. Gould, of Philadelphia, saw a subacute attack in a case of chronic glaucoma in a neurasthenic female cured by forced nutrition.

Dr. L. T. Love, of Mexico, said thet iridectomy is the only remedy in glaucoma.

Dr. A. R. Baker, of Cleveland, asked where the eye-strain could come from when glaucoma develops in a patient seventy-five years of age.

Dr. G. C. Savage, of Nashville, said that even at 120 years of age there might be eye-strain.

Dr. J. J. Chisolm, of Baltimore, stated that by means of eserine and the Japanese hot box he had been enabled to keep many acute cases perfectly under control for many years.

Dr. Tyner asked whether there was no danger of synechiæ forming, upon which Dr. Chisolm stated that he had never seen a synechia develop.

Dr. T. R. Wolfe, of Glasgow, saw several cases of glaucoma develoy in myopia of 5 or 6 D. Although he had found iridectomy frequently disappointing, it is in a large number of the cases the best remedy. He is in favor of paracentesis of the cornea, and values dry heat and eserine highly.

Dr. G. E. Dean, of Scranton, said in conclusion that he condemned only the tendency to rely exclusively on iridectomy. He had not hoped that his *new idea* (?) would be accepted off hand.

Dr. S. D. Risley, of Philadelphia, read a most interesting and carefully elaborated paper on *Hæmorrhagic Glaucoma*, in which he related the trist histories of three cases which had come under his own observation. He thought that hæmor-

rhagic glaucoma is due to uric acid diathesis and to consequent general arterio-sclerosis and not a local affection.

Internally potassium iodide, or better still small doses of corrosive sublimate, frequently repeated, and long continued, with occasional doses of pilocarpine, were commended as useful in the prodomal stage. Locally eserine in very weak solutions was often beneficial, even before the onset of the glaucomatous stage of the disease, but stronger solutions should be employed in the presence of increased tension.

After the onset of the glaucoma no form of treatment promised much hope of permanent relief except enucleation of the ball. Among operative procedures of a less radical character, posterior sclerotomy to relieve the tension and pain, to be followed in twenty-four hours or later by anterior sclerotomy or in some cases by iridectomy seemed to promise most.

In the discussion Dr. Chisolm related a case of hæmorrhagic glaucoma in which he thought that he had saved one eye by means of eserine. Two years after the attack the hæmorrhage was absorbed, but there was still a chronic glaucomatous condition. Then the other eye was attacked by glaucoma. An iridectomy performed on the first eye saved it, while the second eye was lost.

Dr. T. R. Wolfe, of Glasgow, thought that it was almost useless to do anything in hæmorrhagic glaucoma, but that paracentesis of the sclerotic might help to obviate the necessity of enucleating.

WEDNESDAY, SEPTEMBER 6—10 A. M.

The discussion of Dr. S. D. Risley's paper was continued.

Dr. T. R. Wolfe, of Glasgow, speaks highly of the internal treatment advocated by Dr. Risley and especially dwells on the necessity of examining the urine. He laid special emphasis on the role which emotional influences and mental distress play in the causation of glaucomatous attacks, as shown in Dr. Risley's cases. He deprecated the tendency to explain everything in ophthalmology by refractive errors and said he was

afraid that modern ophthalmology was beginning to degenerate into the mere prescribing of spectacles.

Dr. Hubbell, of Buffalo, stated that the arterio-sclerosis had been proven histologically. Why is it, that hæmorrhagic glaucoma is almost always a mono-lateral affection? The disease is neither glaucoma nor hæmorrhagic retinitis in the common acceptation of these terms. He holds the prognosis to be always bad and prompt enucleation the only treatment. He doubted that the case related by Dr. Chisolm was hæmorrhagic glaucoma.

Dr. S. D. Risley explained Dr. Chisolm's case as one who had passed safely through the first and most dangerous stage of arterio-sclerosis, before glaucoma was developed. In four out of twenty cases collected by him the affection attacked both eyes. He again dwelled on the general arterio-sclerosis as underlying the ocular affection.

Dr. Chisolm related the history of his case again in detail and Dr. Risley then called attention to the fact that the case was simply one of glaucoma with a retinal hæmorrhage and therefore did not prove anything with regard to the question whether hæmorrhagic glaucoma was curable by operation or not.

Dr. J. Wallace, of Philadelphia, read a paper on a case of *Spontaneous Replacement of Detached Retina.*

The origin of the trouble was in a traumatic episcleritis, produced by a small piece of hot brass, which was thrown off from a lathe and struck the right eye in the ciliary region. Date of injury, November, 1888. The inflammation seems to have spread at once to the deeper structures, producing haziness of the vitreous and inflammation of the retina. Five months after the trouble the patient noticed a dark stream, starting from the lower part of the eye and spreading upwards (actually from above downwards). May 1889, O. D. counts fingers, iris greenish discolored, large floating masses in the vitreous of a dark reddish color, no view of fundus. 6-9-89, Fingers only seen in outer field. 7-13-89, No perception of hand, retina can be seen by oblique illumination floating for-

wards, its vessels plainly visible and some red spots near the center. Treatment up to this time, potass. sod. sixty grains per diem. Treatment abandoned. 8–11–89, Patient sees hand when held in lower outer field. The detached retina can now be seen limited to temporal side. 9–8–89, Retina has replaced itself still more. The nasal portion of the retina is now visible by the direct ophthalmoscopic method, and to the temporal side can be seen the hæmorrhages. 12–1–89, V. in lower temporal field $^{5}/_{XXX}$. 1–19–90, V. $^{5}/_{LX}$ direct vision. From this time on V. rapidly increased and field of vision spread suddenly out 3–16–90 with + 10 ⊃ + .50 cy. ax. 180 $^{5}/_{XV}$. 7–16–90, + 7.50 ⊃ + .75 cy. ax. 180 $^{5}/_{IX}$. This was the best vision obtained and no change has since taken place. The lesion consisted in the rupture of one of the branches of the upper temporal vein of the right eye. The downward gush of blood was visible to the patient as an ascending dark stream. From the source of the hæmorrhage above to the pool of blood below, a coagulation proceeding to partial organization took place. The subsequent contraction of the clot pulled the retina from the choroid. The co-existing disease of the vitreous rendered this all the more easy. On the first view of the fundus after replacement of the retina, a structure like the strings of a harp was seen to extend from the lower clot. Some of these had snapped in the middle and some had parted at their upper or lower extremities. The mechanism of the detachment is thus easily shown. A small detachment still remains above and below. In the vicinity of the macula is seen a white crescentic line caused by the stretched and distorted retina. A curious metamorphopsia of a straight line appearing curved to the patient corresponds exactly with this defect, and the curve as drawn by him is exactly the shape of the retinal lesion.

The case was illustrated by a large painting of the fundus.

After this paper the subject of the day, *Refraction*, was taken up. The discussion of this subject was deferred until all the papers bearing on it had been read.

Dr. E. O. Belt, of Washington, read a paper on *A Compari-*

son of the Eyes of White with Those of Colored Pupils in the Public Schools of Washington.

The fact of the increase of myopia during school life being established, the important point for the physician to consider as its cause and its prevention.

That heredity and older civilization have much to do with it, would seem to be indicated from comparisons made between pupils in Europe and in this country, and it was thought a comparison between the eyes of white and colored pupils would throw additional light upon this point.

The few cases of abnormal eyes found among the colored pupils, as compared with the white, indicate the influence of heredity, and the more advanced civilization in the causation of defective eyes. Especially is this so of astigmatism, which was found in twenty-five per cent. of the white and in only ten per cent. of the colored pupils. That hypermetropic eyes are unhealthy ones, and tend to become myopic after passing through the stage of emmetropia, seems also to be indicated.

Dr. C, A. Wood, of Chicago, read a paper *On Further Studies of the Cycloplegic Value of Homatropine and Cocaine Discs, as Atropine, Duboisine and Hyoscine Substitutes.*

The results of these investigations (which now number several hundred) are chiefly these:

1. All the cycloplegics fail upon occasions to paralyze the accommodation, and this fact must always be kept uppermost in comparing their merits as cycloplegics. I have numerous cases on my note books where a one per cent. solution of atropine, instilled six times in forty-eight hours revealed (*e. g.*) a much higher degree of hyperopia or astigmatism a couple of weeks after a first trial. In comparing homatropine *plus* cocaine disks, as I have chiefly done in my later investigations, with atropine sulphate (1 per cent solution) and hyoscine hydrobromate (single instillations of a one per cent. solution, examination an hour afterward) I have begun sometimes with one agent, sometimes with the other, so that the assistance obtained by the previous use of another cycloplegic might not only assist the one under observation.

2. Hyoscine hydrobromate, as well as its near relative duboisine sulphate and hyoscyamine sulphate appear, in my hands at least, to be too toxic, too uncertain, and even too dangerous to be used by the patient as atropine can be, and in none of the cases where I have employed all three agents were better results obtained than with atropine—*quoad* the ciliary paresis. Even with the patient under observation in my office or under my assistant's care in the hospital, they all impressed me—take what precautions I would—as dangerous and unreliable agents. Small doses of them are inefficient, and and large doses may prove toxic. In many instances one is reduced to the choice between poisoning one's patient and not relaxing his accommodative spasm.

3. With the foregoing modification, I found little or no difference between the cycloplegic effects of the four named alkaloidal salts and disks of gelatine containing the one-fiftieth grain each of homatropine (alkaloid, Merck) and cocaine (alkaloid, Merck).

4. I used, however, in young subjects, and in cases of suspected accommodative spasm, one disk of the latter every twenty minutes until three had been put into each eye, and made the examination between 80 and 110 minutes after introducing the first disk.

5. That the personal equation should not disturb the accuracy of the observations, every case was first worked out by the retinoscopy method, and under similar conditions, by my painstaking assistant, Dr. T. A. Woodruff, and afterward reviewed by myself. The retinoscopy result was accepted as the refractive condition, and no reliance was placed upon the patient's statements.

6. Tables giving the result in every case form part of this paper, and are in line with the statements just made.

Dr. G. C. Savage, of Nashville, read a paper *On the Necessity for Complete Suspension of Accommodation by Mydriatics in the Adjustment of Glasses.* In this able paper the author maintained that no glass should be prescribed without full paraly-

sis of the accommodation by means of atropia, no matter what the refractive error.

Dr. E. Jackson, of Philadelphia, followed with a paper *On Astigmatism Following Cataract Extractions and Other Sections of the Cornea.* He stated that As was never wanting after cataract extraction and he had seen as high as 15D. A year after the operation As is usually reduced to 4D, and often to less than 3D. It is therefore a wise rule in prescribing cataract glasses to correct only 3D or less of As. A year and a half after the operation the degree of As is usually stationary. The influence of prolapse of the iris on the degree of As is small in comparison to the amount of iris-tissue lying in the wound. The As is due to the interruption of the continuity of the elastic membranes of the eye. The author found that it is well to give the concave cylinder and to have it ground on the back of the plano-convex lens correcting the aphakia, thus producing a periscopic effect.

Dr. L. J. Lautenbach, of Philadelphia, spoke on *A Few Thoughts About Ophthalmometry, as to what the Javal Instrument Will Do and What it Will Not.*

The author stated that nothing but the corneal As could be measured by means of the ophthalmometer, and especially turned against all extravagant claims that have been made by too enthusiastic admirers. The ophthalmometer is a valuable aid in diagnosis—nothing more. The author detailed further on, how changes in the corneal curvature may give hints with regard to internal eye-diseases, particularly of coming attacks of glaucoma, or of other inflammatory changes.

The other papers announced in the program for this day were not read on account of the absence of their authors.

The remainder of the day was given over to the discussion of the papers read and the general subject of diagnosis and correction of errors of refraction. No new points were brought forward and a great deal of the discussion consisted of relating of personal experiences. While some insist on the necessity of using atropine in every case of error of refraction, no matter at what age, others consider it necessary in all cases under

forty-five years of age, others only in children and in cases of esophoria. Some are absolutely satisfied with cocaine and homatropine either in solution or in the shape of Wood's discs. Some maintain that full correction is absolutely necessary, others did not. Skiaskopy and Javal's ophthalmometer had their ardent friends as well as adversaries.

As sickness prevented my attending the session of the following two days, Dr. A. R. Baker kindly consented to give the gist of the discussion after the papers relating to heterophoria had been read.

DISCUSSION FOLLOWING THE READING OF PAPERS ON HETEROPHORIA (THIRD DAY).

BY DR. A. R. BAKER, OF CLEVELAND.

Dr. Geo. L. Stevens, of New York, opened the discussion on muscular errors by stating that when a patient entered his office he immediately recognized the character of his heterophoria by the facial expression He stated that the ophthalmic surgeon who treated muscular errors by operative measures like the mountain climber was constantly seeing what seemed to be the top of the mountain but was misled many times and must expect to be mistaken in the results attained, but like ascending the mountain, if followed long enough and persistantly enough, success would be sure to follow; be the mountain ever so high.

He stated that muscular errors could best be detected and treated without correcting the error of refraction.

This is contrary to his former teaching. He does not believe in the interdependence of convergence and accommodation as generally taught.

He strongly criticised all the methods of tenotomy as described in text-books and detailed at length the operation for partial tenotomy as practiced by himself. He also described an operation of the recti muscles.

Dr. Swan M. Burnett, of Washington, stated that he had become an ardent advocate of partial tenotomy in selected cases of heterophoria. That in a few cases of asthenopia, where spectacles, prisms, muscular exercises, general tonics, in short, everything had failed, he had secured the most brilliant results from the operation, and believed that the profession were un-

der lasting obligations to Dr. Stevens for what he had done in this direction.

Dr. S. D. Risley, of Philadelphia, cautioned the younger members of the Society as to care in selecting cases for operation, and cited several instances in which great harm had resulted from the improper selection of cases. One case was particularly interesting of commencing tabes. Another case which had been under the care of several skillful oculists, and in which muscular exercise, prisms, tenotomy and general tonics had failed to give relief, was permanently cured by the insertion of a pessary. He believed that many of the obstinate cases were caused by a uric acid diathesis and could be cured only by appropriate treatment directed to removal of this cause. On the other hand he had found many of these patients most grateful for relief afforded.

Dr. G. C. Savage, of Nashville, said that he was an enthusiastic admirer of Dr. Stevens and his work. He differed with him however in the statement that refraction errors should not be corrected before testing for muscular errors.

He discussed at length the etiology of heterophoria and showed very conclusively why a few cases of simple hypermetropic astigmatism of low degree with exophoria could wear minus cylinders with more comfort than plus ones.

The Chairman, Dr. Julian Chisolm, of Baltimore, said that the discussion of muscular errors was of even more importance than that of errors of refraction; personally he had seen the most happy results from graduated tenotomies as recommended by Dr. Stevens, and believed it a subject worthy of our most serious and thoughtful study.

Dr. Geo. M. Gould, of Philadelphia, said he believed that tenotomies, graduated or otherwise, for the relief of muscular insufficiencies would not be made in ten years from now, and he thought that some of the gentlemen present would have occasion to regret the numerous tenotomies they were making, as he had already had occasion to regret some of his earlier operations.

He characterized the operation for muscular insufficiency as

unnecessary, unscientific, frought with danger and unworthy our specialty. He believed we were following in the footsteps of the gynecologists who have brought their specialty into disrespect in the minds of all right thinking physicians.

He believed much, if not all, the present literature on this subject would be consigned to the dust bin by the medical historian of the future. Dr. Gould also described the method he persued to strengthen the ocular muscles.

Dr. A. R. Baker, of Cleveland, thought that Dr. Gould would have little occasion to regret his strong condemnation of the promiscuous snipping and cutting of the tendons of the ocular muscles now indulged in by certain ophthalmic surgeons. He said that for many years we have been striving to so perfect our means of correcting errors of refraction as to be able to cure cases of strabismus without resorting to tenotomy. And now that we had about succeeded in curing most of these cases without operative interference in which there is a positive rational indication for operation, these fellows come along and tell us that we must operate in every case where there is the slightest deviation.

He believed division of the tendons in most cases to be unnecessary, and he thought partial tenotomies unscientific and unsuccessful, that a partial tenotomy eventually shortened instead of elongated the tendon, and that when a tenotomy was performed a complete division of the muscle should be made and controlled by a suture if necessary.

SOCIETY PROCEEDINGS.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

HENRY POWER, M.B., F.R.C.S., President, in the Chair.

FRIDAY, JULY 7, 1893.

EPITHELIAL PEARL TUMOR IN THE IRIS, FOLLOWING IMPLANTATION OF EYELASH IN THE ANTERIOR CHAMBER.

This paper, by F. Richardson Cross and E. Treacher Collins, was read by the latter. J. C., aged 8, presented for loss of sight in the right eye, seven months after the eye had been wounded with a piece of wire. On examination, the eye was free from inflammation, tension normal, traumatic capsular cataract, with posterior synechiæ. At the upper inner segment of the anterior chamber was a small nodule, from which an eyelash passed downwards in front of the iris. An operation was undertaken to remove the eyelash, and if possible the small nodule, which was diagnosed to be an epithelial implantation cyst growing from the root sheath of the cilium. The eyelash was readily removed, but the cyst was closely adherent to the iris, which was in its turn so fixed by adhesions, that it could not be extracted, but came away piecemeal in the forceps. The wound healed well. Two months afterwards the tumor had commenced to grow again. The patient then disappeared for nearly a year, after which he returned with great

irritability, lachrymation, and photophobia of the right eye. The tumor had much increased in size, and as the left eye was sympathetically irritated, and the former operation had been so difficult, the eye was enucleated, and sent to Mr. Treacher Collins, who reported the tumor to be surrounded by pigmented iris tissue, and free of cornea, vitreous and ciliary body. The mass situated in the iris was a cyst with opaque white contents lined by laminated epithelium, the cells in contact with the iris tissue the best developed, the innermost ones being flat and scaly; the contents of the cavity consisted of fat globules and polyhedral cells in which no nucleus was stained. They were probably epithelial cells undergoing degeneration. The pupillary border of the iris was united by newly formed fibrous tissue to the anterior capsule of the lens. Seven analogous cases were quoted as showing that the histology of the tumors was similar to this, and that all had resulted from a long residence of an eyelash in the anterior chamber. In contradistinction the successful result of early removal of eyelashes from the anterior chamber was mentioned, and the immediate diagnosis of such a condition and its prompt treatment insisted on.

Dr. Rockliffe (Hull) referred to a case he had reported to the Society (*Oph. Soc. Trans.*, 1883), in which a cystic growth in the anterior chamber followed the implantation of an eyelash. Since that date he had had another case under care in which one eyelash, perhaps two, had been carried into the anterior chamber through a corneal wound by a piece of wire.

Dr. Ernest Clarke had reported a case two years ago. He had been able to remove the eyelash.

Mr. Snell (Sheffield) referred to a case now under his observation. He had operated on the patient for cataract fourteen years ago; there was now a cyst in the anterior chamber, which he thought might be of the same nature as that described by the previous speakers.

THE DIAGNOSIS AND PROGNOSIS OF PATHOLOGICAL MYOPIA.

Dr. Rayner D. Batten read this paper, and after reference to a former paper, in which he maintained that myopia was frequently the result of constitutional disease (*Oph. Rev.*, January, 1892), he said that the object of the present communication was to show that a diagnosis of the constitutional cause of myopia might be made from the condition of the fundus. Physiological myopia should be confined to a simply refractive condition, in which there was no fundus change of any kind. Pathological myopia was not necessarily a refractive condition, and might even be associated with emmetropia or hypermetropia, and was characterized by the formation of crescents, the stretching and distortion of the vessels, the presence of staphylomata, local and general disturbance of pigment. At present physiological myopia was not distinguished from pathological myopia in its early stages, but only when the latter was far advanced. Pathological myopia might be acute, chronic-progressive, or stationary. The acute might end in arrest, or become chronic, and might be the result of various constitutional diseases. In the chronic form a diagnosis might be made between myopia due to cardio-vascular conditions, struma and inherited syphilis, and unhealthy occupations. Pigmentary changes are associated with myopia, marked pigment change at the margin of the crescent was a sign of acute myopia, and in the chronic form a distinction was made between a thin choroid, rendering the choroidal vessels visible and occasionally associated with a very fine dust-like retinal pigment change, and a choroid in which the pigment appeared divided into islands; the former was attributable to cardio-vascular conditions; the latter, to strumous or specific disease. Staphylomata, four classes: (1) That in which the staphyloma was in the macular region; (2) that in which it occurred on the nasal side; (3) that in which the optic disc formed the deepest part of the staphyloma; and (4) that in which it took place towards the periphery. In all cases except the first the refractive condition at the optical axis was

no measure of the extent of the myopia. Peripheral myopia was a cause of astigmatism, by causing distortion of the lens and cornea. Distortion of the vessels, three forms: (1) When the vessels were drawn from their normal course in relation to the optic disc; (2) when they appeared stretched and straightened; (3) when they emerged by separate branches from the optic disc. The direction of the distortion of the vessels depended on the position of the staphyloma. This was particularly marked in cases of nasal staphyloma, the vessels being drawn to the nasal side of the optic disc, and the macular branches having to bend back in order to supply that region. Distortion of the vessels was one of the early signs of commencing myopia. The direction of the distortion pointed to the position of the staphyloma, and the degree of the distortion or stretching of the vessels was an important factor in the prognosis. Central (physiological) cupping of the optic discs, was a form of the staphyloma, and an early manifestation of commencing myopia, and responsible for the exit of the vessels from the optic disc in numerous branches, the main trunk of the vessels having been drawn into the staphyloma. The early premonitory signs of myopia were central cupping, distortion of the vessels, commencing crescents, and astigmatism.

RECURRENT THIRD NERVE PALSY ASSOCIATED WITH MIGRAINE.

Mr. Snell (Sheffield) related two cases; one was in a young man, aged 27. Migraine had existed since the age of 10, but only for the last seven years had the eye been closed with the attacks. The attacks, at first at intervals of about eight weeks, now recurred every two or three weeks; they lasted three or four days. The palsy of the third nerve was practically complete; ptosis and paralysis of the ocular muscles including dilated pupil and palsy of accommodation. The attacks commenced with vomiting and headache. The ocular palsy in the interval did not completely pass off, and the latest accounts, two years after he had last been seen, indicated that the drooping of the lid was becoming more permanent.

The second case was in a girl, aged 18. She had two attacks at intervals of four years, though migraine outbreaks continued in the interval. Each time she had made a perfect recovery, though the third nerve was not, at the worst, as completely involved as in the first case. Recovery was much longer in taking place. Mr. Snell gave additional particulars of a similar case he had brought to the notice of the Society some years ago. He remarked that the shorter the interval the more rapid appeared the recovery in these cases, and also that the affection was always monocular, and showed no disposition to affect the other eye.

LIVING AND CARD SPECIMENS.

Mr. Work Dodd—Pemphigus of Conjunctiva.

Mr. Holmes Spicer—Ectopia Pupillæ.

Dr. Batten—Pigmentary Moles in Retina.

Mr. MacKinlay—Hyperostosis of Skull.

Mr. Lawford—Microscopic Sections of Sarcoma of Conjunctiva.

Mr. Adams Frost—1. Retinitis Proliferans. 2. Papillary Growth or Cornea.

ELECTION OF OFFICERS.

At the conclusion of the meeting the annual general meeting of the Society was held for the election of officers for the ensuing session, and to receive the report of the Council. The following officers were elected:

President—D. Argyll Robertson, M.D.

Vice Presidents—Edgar A. Browne (Liverpool), George Lawson, Stephen Mackenzie, M.D., William M. Ord, M.D., D. C. Lloyd Owen (Birmingham), Henry Power, Simeon Snell (Sheffield), John Tweedy.

Treasurer—George Cowell.

Secretaries—Charles E. Beevor, M.D.; Gustavus Hartridge.

Librarian—W. Adams Frost.

Other Members of Council—Ernest Clarke, M.D.; F. Richardson Cross (Bristol); J. Mackenzie Davidson, M.B. (Aberdeen); Robert W. Doyne (Oxford); A. Hill Griffith, M.D. (Manchester), J. R. Lunn; Joseph Nelson, M.D.; J. A. Ormerod, M.D.; W. C. Radcliffe, M.D. (Hull); A. E. Sansom, M.D.; G. H. Savage, M.D.; A. Quarry Silcock.

After the customary vote of thanks to the retiring officers, the Society adjourned till October.

SELECTIONS.

REMARKS ON ACUTE INFLAMMATION, ACCOMPANIED BY GREAT PAIN IN THE HEAD AND EYES, AND BLEPHAROSPASM, OCCURRING SOME HOURS AFTER WITNESSING ELECTRIC WELDING OPERATIONS. ITS PREVENTION AND TREATMENT.[1]

BY H. FENDELACK HEWETSON, M.E.C.S., F.L.S.,

Hon. Surgeon Eye and Ear Departments Leeds General Infirmary, President Elect Otological Section British Medical Association, 1893.

In view of the advancing utility of electric appliances in the working of iron for various purposes, and having last March opportunities which had never occurred to me before in my experience for seeing no fewer than five cases affected in the eyes by the glare of electric welding of iron, I propose to give a short history of those cases, and to draw attention to the need of extreme care in exposing, or rather protecting, the eyes by scientifically-constructed glasses or shields when in the presence of such a dangerous light.

The principle of this system of welding, known as the Benardo system, it may be as well to state, in passing, consists in the concentration of a great degree of heat upon a small area by means of an electric arc between the metal to be welded

[1]Delivered at a meeting of the Yorkshire Branch of the British Medical Association, held at Sheffield.

and a movable carbon rod conveying the current. It is well known that the temperature of the electric arc is the highest that can be produced artificially, exceeding that of any furnace. A piece of steel can thus be brought to welding heat, or made to run like solder.

The other system is named the Thomson-Houston system, and consists of merely causing a current of electricity to flow through two portions of the metal which are to be united, and owing to the high resistance of the imperfect junction the joint is raised to a welding temperature.

I shall here take the opportunity of thanking Mr. J. Scott Anderson, of Sheffield, for the above description of the methods of electric welding and many other useful hints of its future capabilities, which seem to cover a very wide area of applicability reached on the one extreme by repairing of flaws in a 20-ton shaft, and in the other a silver cream jug or a gold sleeve link.

On March 15 last I was hastily summoned at midnight by the celebrated engineer, Mr. Sampson Fox, to see a party of experts in electric engineering staying with him in Leeds, and who had earlier in the day been engaged for two and a-half hours in conducting experiments on a large scale at some important works at Birmingham. The first patient whom I was particularly asked to see was a German engineer, aged 50. I found him in bed suffering evidently very severe pain indeed, in the head and eyes. He was entirely unable to open his eyes, the blepharospasm being so severe. But I was able to force open the lids and examine the eyes externally. I found the conjunctiva injected and the pupils contracted and apparently fixed. This had been going on for three hours. Cold applications which he was using did not appear to relieve him in the least. Accordingly I dropped a ten per cent. solution of cocaine into the eye freely and ordered him to apply alum lotion, three grains to the ounce of rose water frequently, repeating the cocaine drops at intervals of an hour if he remained awake. This treatment gradually relieved the acuteness of the symptoms, and in about three hours he fell asleep,sleep-

ing for five or six hours. The most remarkable point is that when he was able to open the eyes, the pain had gone, the injection of conjunctiva was much reduced, and he had absolutely no photophobia. His vision two hours afterwards, when I tested him, was perfect; the pupils and tension were normal. The ophthalmoscope revealed no abnormality of the fundus whatever. The second patient was Herr Krupp's manager, the great gun manufacturer, to whom I am greatly indebted for much scientific information upon this important and interesting subject. He also had witnessed the experiments earlier in the day in Birmingham, and observed that the workmen who were immediately engaged in the electric welding wore goggles, the composition and construction of which I shall refer to later on. The engineers had goggles also for their use, but minus the side protectors with which the workmen's glasses were provided. He also told me that five separate weldings of iron were proceeding at the same time in different directions, and that he felt the light pass by his glasses at an angle from a welding which he was not noticing, on account of the absence of the side protectors. I found that he had not suffered so acutely as the first case. Some photophobia had developed earlier in the evening and passed off. There was conjunctival redness and a tendency to contraction of the pupils, but the vision was unaffected. In the morning he was perfectly well without treatment, and I could observe no retinal changes. The third attack occurred in the case of an engineer from Cologne, aged 40. The symptoms in his case were subacute, between the first two in severity. He, too, almost recovered untreated by morning, and the vision and ophthalmoscopic appearances gave negative results, some conjunctival injection only remaining.

Forming part of this assembly of engineers were two from Glasgow, both of whom on a former occasion had suffered very acute symptoms from witnessing electric welding, although apparently well protected by specially constructed goggles but unprovided with side pieces. These gentlemen compared their symptoms to those of their German *confrères*, and they

also got well rapidly under the free use of cocaine drops and cold applications—I believe suggested by Dr. Cluck, of Greenock. I must confess that I had never either seen or read of symptoms of this acute nature caused by electric welding such as the worst case presented, and their occurrence, in the face of their possibilities of electrical advance, which is taking place by leaps and bounds, uponed up whole fields of thought.

It is customary for the workmen in Sheffield, where the electrical welding of iron plates is carried out, to hold shields—which I shall specially describe—in the left hand, so that no direct electric light can possibly strike the eye. These shield-glasses, both in England and Germany, are constructed upon the conviction that it is the chemical rays which are so active in those special processes. The glass is therefore composed in German works of the deepest blue superimposed on red—the combination arranged in tone and tint to compose violet under the impact of this intense light, in fact to cut off the rays, which are known to be nearest the region of the most actively chemical rays of the spectrum of white light. This combination, I am informed, is so dark—or ought to be—that daylight can barely penetrate the glass, still the glare of the electric welding does so sufficiently for the workmen to see what they are doing. None of the workmen are reported to have suffered at all on this occasion, and probably none of the party would have done so had they had side pieces to their goggles.

In conversation with Mr. Scott Anderson's electrical engineer, I elicited some very interesting and valuable hints in regard to protecting the eyes during electrical welding operations. After a large number of experiments, he finds that the best protector is in the form of a wooden shield about 12 inches by 10 with a short handle. Into the center of this shield a series of five sheets of ruby glass are let into a rectangular opening about 5 inches by 3 1-2 set horizontally. This combination of five sheets of ruby glass he finds to be necessary, as sufficient density is not obtained by one plate glass of thickness equal to the five. The test to prove if the shield is

perfect is to hold a lighted candle in front of the shield in an otherwise dark room; and if, through the ruby glass, the flame is reduced to the appearance of a spark, such as is seen in a recently blown out candle, sufficient protection is obtained. This form has been found by experiment to be the best—better than any form of goggles or glasses—to be worn; and he tells me that my patients would never have been attacked had they been provided with such shields instead of the glasses which they wore. There is, further, an additional reason in recommending the use of the shield—the workman can hold it in the left hand, and with the right he directs the carbon rod; the shield protects the skin of the face and neck, which becomes tanned and peals off, just as the skin does when exposed to the rays of the sun—not from any heat, however, which is radiated, but evidently from the chemical rays. The Sheffield engineers do not think that the violet combination which the Germans recommend is so good as the compound ruby glasses in the shield. There are many points of interest which arise in these cases in the endeavor to explain the symptoms which I have recorded.

Probably the action is analogous in a minor degree to those instances in which the retina has been either temporarily or permanently damaged by the glare from a flash of lightning. If such severe symptoms may be caused by the chance striking of a small amount of such light, comparatively, into the periphery of the retina, how much more disastrous and acute the symptoms must nesessarily be if by some accident the glasses or shields were broken or removed, and thereby exposing the eyes to the fierce glare unguarded. I am told by the engineer such is the convenience of this form of welding that it must rapidly come into constant use, especially where the electric light is already laid on, since this form of electric transmission can be reaeily utilized at a comparatively small cost. It is evident that with sufficient protection, such as I have described, no harm is found to occur, and I daresay that the eye may to a certain extent become tolerant of this light. It is the first occasion on which I have observed an eye disor-

der to be induced by electric welding or electric lighting of any kind. Other observers think that they are able to trace some forms of asthenopia and photophobia to this cause. But this is an extension of the subject which is outside the object of this special paper, and it is not my present intention to pursue it further than to notice this fact, observed by others, as being widely interesting when taken in connection with the more general question of electric illumination.—*British Medical Journal.*